facebook

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Radio Spectrum Policy Group—Secretariat
DG CNECT B4: Spectrum- Office: BU33 7/065
European Commission, B-1049 Bruxelles, Belgium

RE: Public consultation on Strategic spectrum roadmap towards 5G for Europe—2nd RSPG Opinion on 5G networks, RSPG17-034

Facebook, Inc. ("Facebook") is pleased to submit these comments in response to the Radio Spectrum Policy Group's ("RSPG") consultation regarding its draft second opinion on a Strategic spectrum roadmap towards 5G for Europe.[1] Facebook supports the RSPG's efforts to lay out a strategic roadmap to facilitate the launch of 5G on a large scale across Europe.

Facebook's mission is to give people the power to build community and bring the world closer together. And, connecting people is a critical first step in executing this mission. Today, nearly four billion people—60% of the people on the planet—are still not connected to the Internet. And because the rate of Internet penetration growth has slowed from 14% to under 7% in 2015, Facebook launched its own initiatives to develop new technologies and specifically focus on connecting the unconnected. [2] Connecting these people—most of whom live in the developing world—is a complicated effort that requires not just bringing network infrastructure to more people, but involves addressing the regulatory environment.

Spectrum policy is a key part of the regulatory environment that affects both the affordability and availability of the Internet. Improving connectivity in Europe and around the world means pursuing spectrum policy that maximizes the utilization of this limited resource and promotes the expansion of both the capacity and coverage of wireless networks. As the RSPG crafts its strategic roadmap, we encourage the group to promote spectrum policies that help to achieve these objectives in Europe, while also setting an example for the rest of the world.

To this end, as explained in more detail below, Facebook believes that access to the 26 GHz priority 5G band, and future access to the 38 GHz and 47/48 GHz band should allow for the possible development of fixed services in these bands, specifically, high altitude platform stations ("HAPS"). HAPS deployed on unmanned solar platforms can be used to bring broadband and 5G services to underserved markets. In addition, Facebook strongly supports the

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[1] Radio Spectrum Policy Group, Strategic Spectrum Roadmap Towards 5G for Europe, DRAFT RSPG Second Opinion on 5G for Europe, Brussels, 21 November 2017, RSPG17-034 FINAL, *available at* http://rspg-spectrum.eu/public-consultations/. ("Draft RSPG Second Opinion").

[2] Internet.org by Facebook, State of Connectivity 2015—A Report on Global Internet Access at 6-8 (Feb. 22, 2016).

RSPG's opinion that a general authorization frequency regime is "foreseen" in the 66-71 GHz band, which "could become an important band for 5G."[3] Together with the 60 GHz band (57-66 GHz), making the 66-71 GHz band available under a licence-exempt framework will enable Europe to reap the benefits of new multi-Gigabit wireless IEEE 802.11-based technologies that are currently being developed in the band.

(1) Access to the 26 GHz band and future access to the 38 GHz and 47/48 GHz band should allow for the potential role of HAPS in the 5G ecosystem.

Facebook supports the RSPG's opinion that "the Commission, together with Member States, should take actions to fully support 5G related policy objectives in rural areas wide coverage, taking into account the role of satellite in achieving ubiquitous connectivity."[4] Connecting the unconnected in Europe and around the world will take a mix of technical solutions across multiple technologies and platforms. Accordingly, Facebook supports more spectrum being made available for flexible use across platforms, including in the 26 GHz, 38 GHz, and 47/48 GHz bands.[5]

In addition to terrestrial and satellite platforms, Facebook believes HAPS will provide a means to extend the reach of broadband networks in rural and remote areas. Facebook and other companies are developing solar-powered, high-altitude unmanned fixed wing aircraft to deliver broadband fixed backhaul connectivity to extend the reach of broadband providers' networks. [6] As 5G bands like the 26 GHz band are built out, more users will enjoy high-speed connectivity and broadband providers will have more traffic to backhaul. 5G will generate more demand for higher broadband speeds and IoT applications in underserved markets. And, within the 5G ecosystem HAPS can help extend broadband networks with lower cost backhaul without degrading the 5G services. As noted by the United Nations Broadband Commission, "Developments in aeronautics and radio technologies have made HAPS a viable option to supplement existing network technologies and help bring broadband backhaul to unserved and

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[3] Draft RSPG Second Opinion ¶ 9 at 5.

[4] *Id*. ¶ 2 at 4.

[5] *Id*. ¶ 9 at 5. The 38 GHz Band and 47/48 GHz bands were not identified as priority bands in the Draft RSPG Second Opinion. *See id*. at 20, Section A.4 (listing the 37-40.5 GHz and 45.5-50.2 GHz bands as "other bands being studied as part of the preparation process for WRC-19").

[6] https://www.theguardian.com/technology/2017/jul/02/facebook-drone-aquila-internet-test-flight-arizona

underserved regions of the world, particularly remote and rural areas of developing countries."[7]

Currently, the International Telecommunication Union (ITU) is studying how to facilitate access to broadband applications delivered via HAPS, such as the unmanned solar plane Facebook is developing.[8] The HAPS WRC-19 agenda item requires the ITU to study possibly modifying the existing identification for HAPS.[9] Facebook has assisted in preparing studies for the ITU-R, which show that HAPS—treated as an application in the terrestrial-fixed service at the ITU—can co-exist with mobile, fixed and fixed satellite in these bands.

As the RSPG, and ultimately Member States of the European Union, develop a licence regime for the 26 GHz pioneer band, Facebook agrees that an "individual licence regime," maintaining the possibility to develop existing services, including the fixed service, in the band is most appropriate, and would allow HAPS use of this spectrum in support of other 5G applications and services.[10] The same would hold true for future authorisation of the 38 GHz and 47/48 GHz bands. An individual licence regime for small cells would promote sharing across platforms and allow HAPS to enhance the 5G ecosystem.

(2) Facebook strongly agrees that a general authorised frequency use regime is appropriate for the 66-71 GHz band.

Facebook agrees with the RSPG Draft Second Opinion that a general authorised frequency use regime should be applied to the 66-71 GHz band, "which could be an important band for 5G."[11] Facebook supports the use of a license-exempt framework for both indoor and

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7 United Nations Broadband Commission for Sustainable Development, Report "Working Group on Technologies in Space and the Upper-Atmosphere: Identifying the potential of new communications technologies for sustainable development," (Sep. 2017) at 30, *available at* http://www.broadbandcommission.org/Documents/publications/WG-Technologies-in-Space-Report2017.pdf.

8 *See* Resolution 160 (WRC-15_ available at https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000C0015PDFE.pdf

9 Resolution 160 resolves that the ITU-R will study the existing HAPS identification of 27.9-28.2 GHz (paired with 31.0-31.3 GHz) as appropriate 38-39.5 GHz. In addition, in Region 2, the ITU-R will study 21.4-22 GHz and 24.25-27.5 GHz. *See id.*

10 Draft RSPG Second Opinion, ¶ 9.

11 *Id.* ¶ 10.

outdoor use across the 60 GHz band (57-66 GHz) and through the Extended 60 GHz band (66-71 GHz). In the 60 GHz band, new services have developed ranging from outdoor wireless links that extend the reach of fiber networks to personal networking technologies based on the WiGig standards 802.11ad and 802.11ay that deliver multi-Gigabit speeds between devices.[12] And more is yet to come. The huge demand for network capacity is driving investment in 60 GHz licence-exempt technologies for wireless backhaul and other uses, particularly as the technology is evolving to allow for non-line-of-sight applications. For example, last year, Facebook announced its Terragraph project, a low-cost high-throughput (multi-Gigabit) multi-node mesh wireless network for dense urban topologies that could provide fiber-like reliability for access and backhaul at a lower upfront cost.[13]

Extending licence-exempt access to additional adjacent bands such as the 66-71 GHz band would increase such opportunities. In fact, the latest IEEE 802.11-2016 standard defines six 2160 MHz channels including three that require access to spectrum in the 64-71 GHz band.[14] For these reasons, the United States has recently made available the 64-71 GHz band and Canada has proposed to do so.[15]

In addition to extending licence-exempt access to 66-71 GHz, Facebook encourages Member States of the European Union to also consider making the full 60 GHz band (57-66 GHz) licence-exempt for both indoor and outdoor use. The wide channelization (2160 MHz) in the 802.11ad standard allows for links that support multi-Gigabit capacity. It is critical that a

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[12] For example, Siklu's point-to-point and point-to-multipoint mmWave radios facilitate reliable, fiber-like transmission for high-density implementations. *See* https://www.siklu.com/wireless-radios-portfolio/; and the WiFi Alliance has certified WiGig short range devices. *See* https://www.wi-fi.org/news-events/newsroom/wi-fi-certified-wigig-brings-multi-gigabit-performance-to-wi-fi-devices.

[13] Introducing Facebook's new terrestrial connectivity systems—Terragraph and Project Aries, https://code.facebook.com/posts/1072680049445290/introducing-facebook-s-new-terrestrial-connectivity-systems-terragraph-and-project-aries/

[14] Table E-1, US Operating Class 34, and/or Table E-4, Global Operating Class 180.

[15] Federal Communications Commission (FCC), Report and Order (R&O) and Further Notice of Proposed Rulemaking (FNPRM), Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al, FCC 16-89 (July 2016) https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-89A1.pdf; Innovation, Science and Economic Development (ISED) Canada, Consultation on Releasing Millimetre Wave Spectrum to Support 5G, SLPB-001-17 (June 2017) at 21-23, https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/slpb-001-17-5G.pdf/$file/slpb-001-17-5G.pdf.

licence-exempt framework be used for the full 14 Gigahertz of 57-71 GHz spectrum to allow for the use of IEEE 802.11-based technologies in the band.

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